What is claimed is:

Sub A1

1. An optical measuring device, comprising:

an interferometer measuring element, that uses imaging interferometry to measure a position of an object; and

an object moving device, moving said object while said position is being measured.

2. A device as in claim 1, further comprising a modulatable light source, and a synchronization device, which synchronizes said moving with modulation of said light source.

3. An optical measuring device, comprising:

a chamber, having a transparent viewport, and a holding element for an object to be measured inside said chamber;

an interferometer measuring element, that uses imaging interferometry to measure a position of the object while in said chamber by forming a main arm including said object, and a reference arm that does not include said object.

4. A device as in claim 3, wherein said reference arm includes a compensating plate that compensates for optical effects of said viewport.

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5. A device as in claim 4, further comprising an object moving device, moving said object while said position is being measured.

6. An optical measuring device, comprising:

a light source capable of modulation at a rate greater than 10 Khz;

a sample interface device, adapted to hold a sample to be imaged, and including an ability to move said sample at a predetermined repetition rate;

a signal generator, producing a pulse output for said light source, and a periodic signal output for said sample interface device, said outputs having a predetermined relationship with one another; and

an interferometer movement detecting device, producing, at each pulse of light output from said light source, an interferometric measurement of a position of a sample on said sample interface device.

7. A device as in claim 6, wherein said interferometric device comprises a first arm producing a sample beam, and a second arm producing a reference beam, and producing an interference between said sample and reference beams.

8. A device as in claim 7, wherein said sample interface device includes an enclosed area, with a transparent viewport through which said sample beam enters; and

a compensating plate, placed in said reference arm, to compensate for effects of said viewport.

9. A device as in claim 7, wherein said interferometer is a Michelson interferometer.

10. A device as in claim 7, further comprising a camera, imaging results of said interferometer movement detection device.

11. A device as in claim 7, wherein said sample is a MEMS device, and said signal generator is capable of varying a phase between said light source and said movement of said MEMS device.

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~~12. A device as in claim 7, wherein said pulse generator produces a strobe output, having a pulse width during which the sample will not move enough to blur an interferometric measurement.~~

13. A device as in claim 12, further comprising a camera, acquiring said interference.

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14. A device as in claim 12, further comprising a processor, measuring said interference, and integrating the measuring over a plurality of cycles.

15. An optical measuring device, comprising:

a light emitting diode;

a sample interface device, adapted to hold a sample to be imaged, and including a vacuum-tight chamber with a transparent viewing portion, and including an ability to move said sample at a predetermined repetition rate;

a signal generator, producing a pulse output for said light emitting diode to produce a pulse of light from said light emitting diode, and a periodic signal output for said sample interface device, said outputs having a predetermined phased relationship with one another such that said pulse of light occurs at a predetermined point in a movement of said sample; and

an interferometer movement detecting device, producing an interferometric measurement of a position of a sample on said sample interface device based on reflections of light from said light source, said interferometer movement measuring device including a reference arm with a compensating plate therein that compensates for the effect of said transparent viewing portion.

16. A device as in claim 15, wherein said interferometer movement detecting device integrates said reflections for a plurality of said pulses of light.

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~~17. A method of measuring a characteristic of a moving device using optical interferometry, comprising:~~

~~moving a sample to be imaged at a predetermined repetition rate;~~

~~illuminating said sample using pulses of light, that occur for time periods that are short enough that said sample will not have moved enough to blur an interferometric measurement during each pulse; and~~

~~guiding said pulses of light both to said sample, and to a reference arm, and obtaining an inteference fringe between reflections of light.~~

18. A method as in claim 17, wherein said illuminating produces pulses more frequently than 1kHz.

19. A method as in claim 17, further comprising placing said sample in an enclosed area, with a transparent viewport; and compensating for optical effects of said viewport.

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~~20. A method as in claim 17, further comprising varying a phase between said light source and said movement of said MEMS device.~~

21. A method as in claim 17, further comprising integrating the measuring over a plurality of cycles.

22. A method as in claim 19, further comprising evacuating said enclosed area.

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